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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/918,874	07/30/2001	Seth Marder	21182-7067	3252

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EXAMINER

METZMAIER, DANIEL S

ART UNIT	PAPER NUMBER
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1712

DATE MAILED: 10/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/918,874

Applicant(s)

MARDER ET AL.

Examiner

Daniel S. Metzmaier

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3 and 16-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 3 is/are allowed.
- 6) ☒ Claim(s) 16-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 3 and 16-18 are pending.

Election/Restrictions

1. Claim 16 has been examined to the extent they read on the elected species. The remaining species in the claims 17 and 18 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 16, 2004 and acknowledged in the Office action mailed July 9, 2004.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

3. Claims 16-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Each of R_{e-m} , it is unclear what an amino acid is reacted to form said functional group. A similar situation exists and it is unclear what is intended for R_{a1-a3} , R_{b1-b3} , and R_{g1-g3} .

The structures define m, n, and o as possibly = zero and $m + n + o \geq 1$. the subscript "n" defines a repeating groups that is nested within the repeating unit defined by the subscript "m". When $m=0$, $n=1-10$ and $o=0$, the limitations of the structure are

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met but it is unclear where is the pi bridge. Thus, the claims are vague and indefinite regarding the metes and bounds of the subject matter, which applicants intend.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claim 16 is rejected under 35 U.S.C. 102(b) as being anticipated by Sekisui Chem Ind KK, JP 02-187734A¹, as evidenced by Derwent Abstract, AN 90-265816/35 and partial translation. Sekisui Chem Ind KK discloses compounds reading on those employed in the claimed methods for use in semiconductor lasers. The step of two-photon absorption would have been inherent to the Sekisui Chem Ind KK compounds used as disclosed therein. Sekisui Chem Ind KK (column 12 as shown in the partial

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translation) discloses the method of subjecting the disclosed compounds to an Nd:YAG laser beam at 1.064 μm (1064 nm) wavelength and 10-mJ/pulse outputs. Since the energy units are given in mJ/pulse, it is reasonable to conclude that the laser beam employed in the Sekisui Chem Ind KK reference is a pulsed laser.

Furthermore, the result of irradiation with said laser produces a second harmonic generation, thereby observing green light at a wavelength of 532 nm, which is $\frac{1}{2}$ the incident light. The relaxation of the excited state to emit 2x the energy of the incident radiation / $\frac{1}{2}$ the wavelength is evidence that at least some simultaneous multi-photon absorption occurs in the process as inherent to the production of the second harmonic generation resulting from the pulsed laser irradiation of the same compounds.

Applicants' claims lack any limitations of the degree or amount of multi-photon absorption, the wavelength, or the result of the multi-photon absorption. The methods require irradiating a compound that is claimed with incident radiation to cause a multi-photon absorption and converting the compound to a multi-photon excited state. The wavelengths of the multiple photons are not required to be the same.

6. Claims 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Puccetti et al, "Chain-Length Dependence of the Third-Order Polarizability of Disubstituted Polyenes. Effects of End Groups and Conjugation Length", *J. Phys. Chem.*, 1993, 97, pp. 9385-9389². Puccetti et al (particularly page 9386 and 9387) disclose compounds reading on those employed in the claimed process (regarding

¹ Cited in applicants Information disclosure statement.

² Reference is cited in applicants IDS.

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claims 16 and 17, when $m = 0$), which are measured employing a pulsed Nd:YAG lasers to measure the second and third harmonic generation.

The result of irradiation with said laser produces a second or third harmonic generation, thereby resulting in relaxation, which is at least $\frac{1}{2}$ the incident light. The relaxation of the excited state to emit 2x or 3x the energy of the incident radiation / at least $\frac{1}{2}$ the wavelength is evidence that at least some simultaneous multi-photon absorption occurs in the process as inherent to the production of the second harmonic generation resulting from the pulsed laser irradiation of the same compounds.

Applicants' claims lack any limitations of the degree or amount of multi-photon absorption, the wavelength, or the result of the multi-photon absorption. The methods require irradiating a compound that is claimed with incident radiation to cause a multi-photon absorption and converting the compound to a multi-photon excited state. The wavelengths of the multiple photons are not required to be the same.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

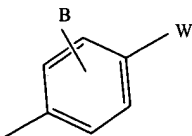
8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 16-18 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Prasad et al, US 5,912,257.

Prasad et al (abstract ; column 10, lines 40 et seq ; column 37-38, lines 64 et seq; and claims) discloses styryl dyes that exhibit two-photon absorption. Prasad et al further discloses the compounds that read on those compounds employed in the instant

claimed methods when Q is , wherein B is alkoxy and W is an acceptor group, such as those set forth in Prasad et al (column 17, lines 21 et seq) including -NO₂, -CN, or sulfates. Said groups and the compounds having said groups are clearly envisaged and read on the claimed groups defined by "R_e-R_m" in claims 16-18.

To the extent Prasad et al differs from the claims in the disclosure of the methods with due to the breadth of the compounds employed, the fact that the reference discloses several possible combinations does not make any particular combination less obvious. Said compounds are employed for the same process of producing a multi-photon absorption and would have been obvious to one having ordinary skill in the art at the time of the invention for the utilities disclosed in the Prasad et al reference.

Allowable Subject Matter

10. Claim 3 is allowed.

Response to Arguments

11. Applicant's arguments filed July 31, 2006 have been fully considered but they are not persuasive.

12. Regarding applicants request for an interview. The examiner may be reached at the number at the end of this Office Action. The previously action presented newly cited art. An interview without applicants' review of said art would not have been productive. Instantly, applicants set forth a response, which is addressed herein.

13. Applicants (page 17) Prasad teaches the optical harmonic generation and NLO phenomena such as harmonic generation are distinct from two or multiphoton absorption. This is not agreed and not deemed persuasive since Prasad teaches all the methods as frequency upconversion lasing techniques. While the mechanism of the upconversion may not be identical, i.e., harmonic methods require phase matching, said methods are not disclosed as distinct regarding the absorption of two-photons. It is noted that the prior art teaches irradiating materials reading on those claimed in the claimed methods. Applicants claims do not require any limitation on the irradiating light.

Furthermore, where the compounds treated and the steps acting on said compounds are indistinct from the claims, it is reasonable to expect the compounds to have the properties of the claimed invention. It is a well known tenet in patent law that a compound and all of its properties are generally inseparable. *In re Papsech*, 315 F2d. 381, 137 USPQ 43, (CCPA 1963). The absorption properties are a property of the compounds. Sekisui Chem Ind KK disclose the irradiation of the compounds with a

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pulsed Nd:YAG laser resulting in second harmonic generation and the relaxation of $2x$ the energy / $\frac{1}{2}$ the wavelength, which is evidence of the multi-photon absorption.

14. Applicants (pages 17-18) assert the harmonic generation is created by induced electrical dipole rather than two-photon absorption. This has not been deemed persuasive since the claims read on the method steps and said steps would have inherently produced the same results. Applicants have not shown that two-photon absorption is not occurring in the methods of the prior art, which otherwise read on the claims.

Furthermore, a multiple-photon absorption would occur and applicants argued conversion and measure of the relaxation of the excited state does not show the methods to be distinct.

15. Applicants (pages 19 and 20) assert the examiner has not met the burden of showing anticipation. This has not been deemed persuasive since the claims read on the method steps and said steps would have been expected to inherently produce the same results. Applicants have not shown that two-photon absorption is not occurring in the methods of the prior art, which otherwise read on the claims.

16. Applicants (pages 20-21) assert the Prasad reference discloses acceptor groups and not donor groups. Applicants claimed compound provide for acceptor groups and donor groups. The compounds of Prasad claims provide for "B" as an alkoxide, which is a donor group as instantly claimed. The compounds of Prasad claims provide for an acceptor group including $-\text{NO}_2$, $-\text{CN}$, or sulfates, which reads on the instant claimed groups $\text{R}_{\text{e-m}}$ that are substituted on the same aromatic ring as the alkoxy group.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Metzmaier whose telephone number is (571) 272-1089. The examiner can normally be reached on 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Daniel S. Metzmaier
Primary Examiner
Art Unit 1712

DSM